SEMATECH-NIST Collaboration at NSLS - Shining a Light on Obscure Causal Performance Mechanisms

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Obtaining accurate physical and chemical spectra to elucidate the mechanistic pathways giving rise to electrical performance in support of the continued development of high performance logic and memory devices is highly critical to the semiconductor industry. Overcoming key technical challenges of novel circuit designs requires the most advanced analytical tools equipped with the highest spatial resolution available. Furthermore, utilizing variable and high energy synchrotron sources enables probing deeply buried layers and interfaces of samples that most precisely represent film systems corresponding to the device structures of interest. This talk will highlight several breakthroughs in physical characterization of advanced nanoelectronic film systems realized through the collaboration of SEMATECH with the NIST Synchrotron Methods Group at NSLS. In addition, several industry goals with no known solution on the *International Technology Roadmap for Semiconductors* will be presented *vis-a-vis* SEMATECH's potential experimental opportunities at NSLS-II, as the pace of industry scaling places greater demands on characterization of extremely subtle chemical variations in thinner layers buried more deeply.